Poster 4.30

Effects of Optical Flow on Gait Patterns in Parkinsonian Rats

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Parkinson's disease (PD) is a common age-related neurodegenerative disorder in which visuospatial cognitive functions including spatial navigation are impaired. The characteristic gait disturbances of Parkinson disease (PD) include shuffling gait, short steps and low walking velocity. Research has shown that gait improvement can be facilitated by the perception of motion from optical flow, i.e. moving visual cues. In this study we investigated the features of treadmill walking in a rat of partial akinesia obtained from PD caused by unilateral infusion of the neurotoxin 6-hydroxydopamine (6-OHDA) into substantia nigra pars compacta. The images of foot prints of rats walking on the transparent belt of a treadmill were captured using a digital camera. Image analysis was performed off-line to identify the foot contact time of bilateral hindlimbs as well as the body orientation of control and PD rats during treadmill walking. The parameters of swing and stance time were firstly evaluated. Compared with controls, the gait impairment in PD can be clearly observed from asymmetrical gait patterns from a decrease in swing time especially in the affected side but an increased in stance time of both hindlimbs. Our results suggested that the unilateral rat model of PD reflected compensatory changes in the sound side for motor deficits resembling the key features of human parkinsonian gait. The validation tests of animal behaviors were further observed from the changes of body orientation performed under the influence of optical flow.